# Hand Replantation: A Case Report in a Brazilian Tertiary Hospital

## *Reimplante de mão: Um relato de caso em um hospital terciário*

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## Abstract

The hand plays a crucial role as an organ of communication and environmental interaction. Its absence causes irreversible deficits in social and professional life activities, even with the use of modern prostheses. Most victims of hand trauma in Brazil are male and economically active. Traumatic hand amputation requires skillful surgical treatment to achieve functional recovery and spare the amputated extremity. The medical team must have these goals in mind after saving the patient's life. Although aesthetics is within the treatment goals, one should prefer a functional, useful hand with pincer function. In this work, we report a case of hand replantation using a microsurgical technique at the Instituto Dr. José Frota, a tertiary hospital in Fortaleza, Ceará, Brazil.

**Keywords**

- arm injuries
- arteriovenous anastomosis
- exercise therapy
- finger phalanges
- hand
- hand injuries
- median nerve
- microsurgery
- replantation
- tendon injuries

## Resumo

A mão tem função importante como órgão de comunicação e de interação com o ambiente. Sua ausência causa déficit irreversível nas atividades da vida social e profissional, mesmo com o uso das próteses modernas. A maioria das vítimas de traumatismos na mão no Brasil é do sexo masculino e em plena idade produtiva. A amputação traumática de mão requer tratamento cirúrgico hábil para alcançar recuperação funcional e salvar a extremidade amputada. Este deve ser o objetivo da equipe médica, depois de resguardada a vida do paciente. Embora a estética esteja dentro dos objetivos de tratamento, deve-se priorizar uma mão funcional e útil, com função de pinça. Neste trabalho relatamos um caso em que foi utilizado a técnica microcirúrgica para realizar um reimplante de mão no hospital terciário Instituto Dr. José Frota em Fortaleza, Ceará, Brasil.

**Palavras-chave**

- ferimento em braço
- anastomose arteriovenosa
- terapia por exercicio
- dedos e falanges
- mão
- ferimento em mão
- nervo mediano
- microcirurgia
- reimplante
- ferimento em tendões

*The present study was performed at the Hospital Instituto Dr. José Frota, Fortaleza, CE, Brazil.*

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## Introduction

In 1962, Malt performed the world's first successful replantation in Boston and, in 1963, Ch'em reimplanted a forearm in Shanghai. The vessel's diameter was greater than 2 millimeters, and the suture threads were not appropriate. Experimental reports of limb replantation attempts date from the beginning of the last century. In Brazil, Ely et al. reported the first replantation in 1968, in Porto Alegre.[1] The first hand replantation in Latin America took place in 1971, in São Paulo, by the plastic surgeon Marcus Castro Ferreira and his team.[2] This same team also performed the first finger replantation on the continent, 2 years later. It was sensible that the hand came before the finger: the smaller the limb, the greater the difficulty of replantation.

The hand plays a crucial role as an organ of communication and environmental interaction. Its absence causes irreversible deficits, even with the use of modern prostheses, in social and professional life activities. Most hand trauma victims in Brazil are male and economically active. Traumatic hand amputation requires skillful surgical treatment to achieve functional recovery and spare the amputated extremity. The medical team must have these goals in mind after saving the patient's life. Although aesthetics is within the treatment objectives, one should prioritize a functional, useful hand with pincer function.[3]

Moreover, the physical and psychological sequelae resulting from amputations can significantly impact patients' quality of life, requiring medical and multidisciplinary interventions to minimize damage and promote full recovery.

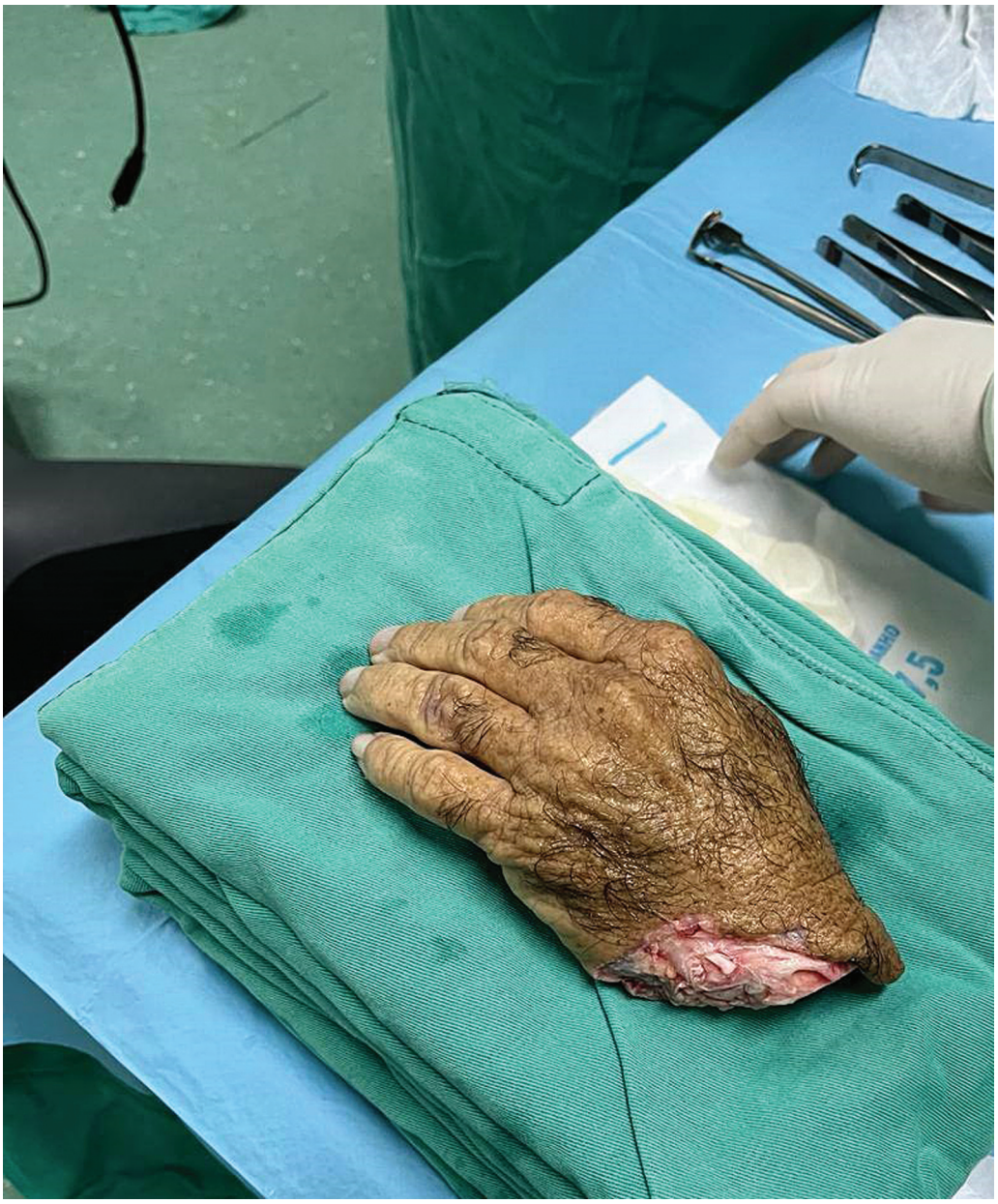

**Fig. 1** Amputated hand.

Such interventions entail substantial costs for treatment and rehabilitation. These costs have a significant global dimension, reflecting not only the financial resources directed towards medical care, but also the social and economic burden related to the physical, emotional, and social consequences for amputee patients.

Therefore, it is crucial to analyze this replantation case at a referral hospital for a better understanding of the extent of the issue, identifying risk factors, and enhancing treatment strategies.

## Objective

The present study aimed to report descriptively the technical approach and outcomes of a patient who underwent hand replantation.

## Materials and Methods

This observational, descriptive, cross-sectional, analytical, and retrospective study used forms completed by hand replantation patients, findings from direct interviews, and active data retrieval from medical records in the database of the Instituto Doutor José Frota (IJF), a major tertiary hospital in Fortaleza, Ceará, Brazil.

## Results

### Case Report

A 56-year-old patient (IPB), male, married, born and living in Fortaleza, was admitted to the hospital following an accident involving a saw in a butcher shop. He presented with a total amputation of his left hand at the wrist level with bone and tendon exposure. The patient arrived with a tourniquet on his left arm and his amputated hand in an ice-filled container. He reported that the accident had occurred approximately 40 minutes before. On examination, he was stable but moderately pale due to significant blood loss, with no loss of consciousness, and a heart rate close to 110 bpm, indicating grade 2 hypovolemic shock. There were no signs of abrasions or trauma to other limbs (►**Figs. 1**–**3**).

The medical team must ask for the injury location and the time elapsed between the lesion and primary care (clean or contaminated wound).[3] The recommended initial step is to

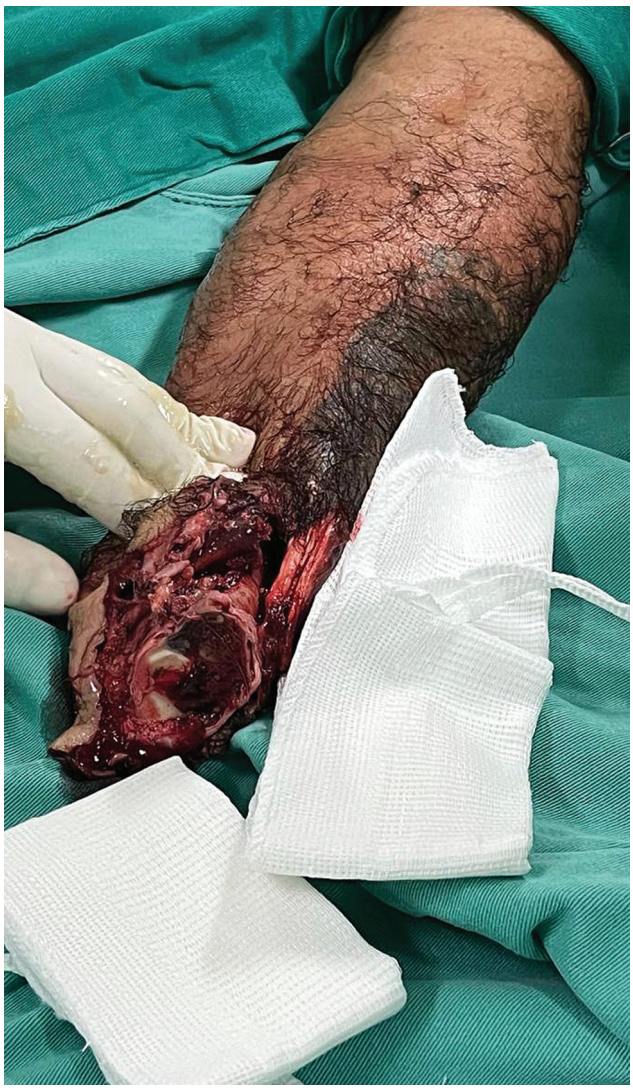

**Fig. 2** Proximal stump of the forearm.

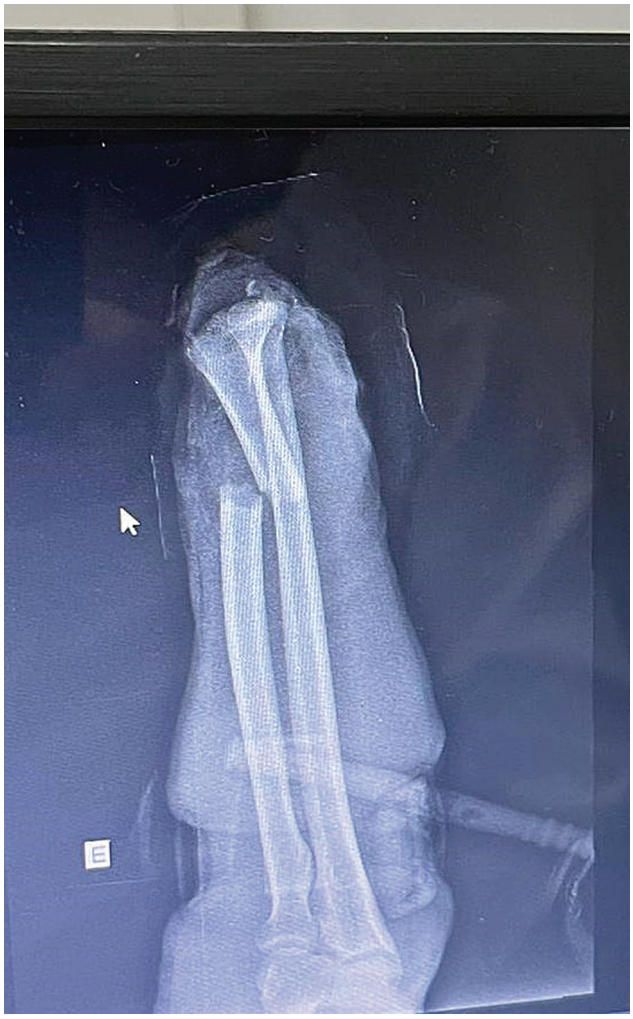

**Fig. 3** Preoperative radiograph.

wrap the wound (i.e., proximal stump of the amputated extremity) with a clean cloth or sterile compress, followed by local compression with a crepe bandage. The amputated segment should be thoroughly washed with 0.9% saline solution, wrapped in a clean compress, and placed in an ice-filled container. Cooling (4°C) increases the time until tissue damage from 3 to 6 hours under normal conditions to 12 to 24 hours. However, tissue damage may occur earlier depending on the amount of muscle tissue involved. The time between trauma and revascularization should not exceed 6 hours.

After initial measures according to the Advanced Trauma Life Support (ATLS) protocol, we performed the following surgical steps: vascular stump dissection with identification of the radial and ulnar arteries, and the ulnar and median nerves; heparinization of the blood vessels of the amputated extremity; bone fixation of the radius and wrist block with Kirschner wires; primary microvascular anastomoses of the radial and ulnar arteries and three dorsal veins; suture of the median and ulnar nerves under microscope guidance; and, finally, an en bloc flexor tenorrhaphy and skin grafting over the wound due to tissue loss (►**Figs. 4**–**7**).[4]

The patient presented with good hand perfusion and required temporary immobilization due to the fragility of the anastomoses. Pulse oximetry was monitored during hospitalization. The patient was cooperative throughout the admission, leading to a better outcome. After 10 days under observation, the patient was discharged from the hospital with instructions for care and outpatient follow-up (►**Fig. 8**).

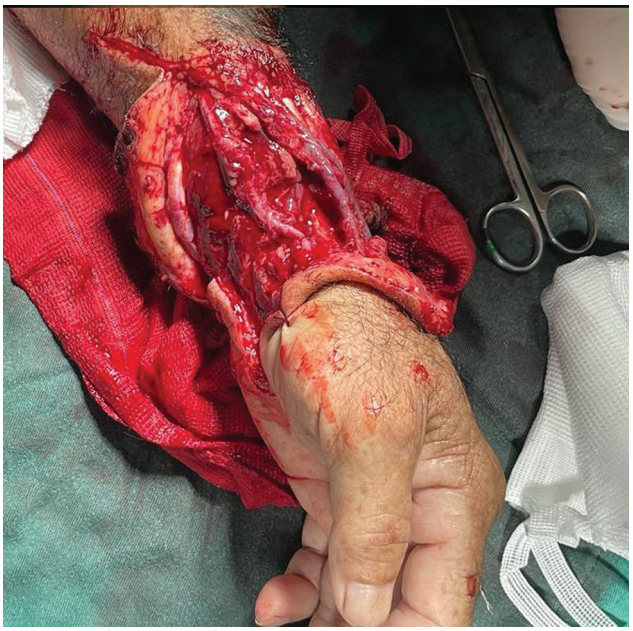

**Fig. 5** Radial artery anastomosis.

During a follow-up outpatient visit, the patient reported significant difficulty in starting physical therapy through the public healthcare system, which delayed rehabilitation. The

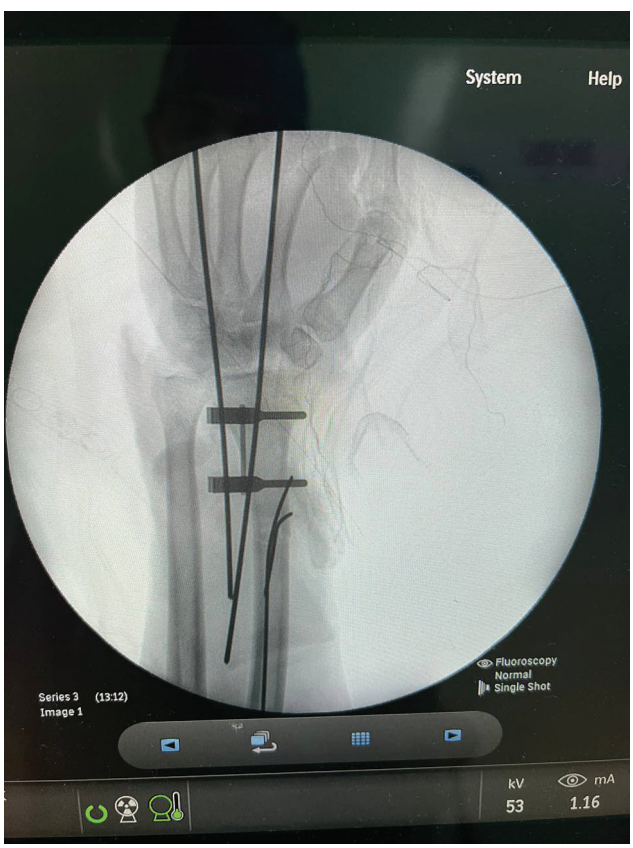


**Fig. 4** Bone fixation of the radius and wrist arthrodesis.

**Fig. 6** Dorsal vein anastomosis.

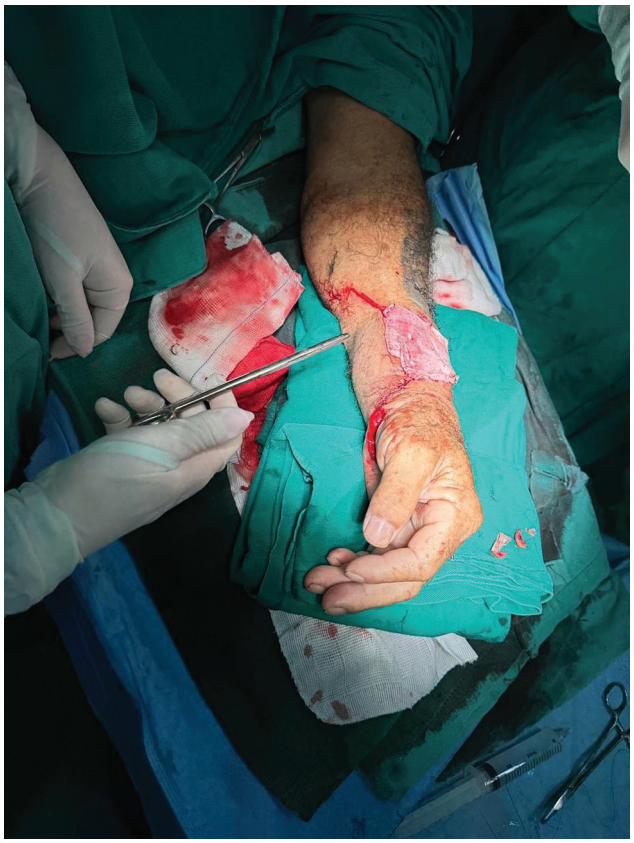

**Fig. 7** Skin graft over anastomoses.

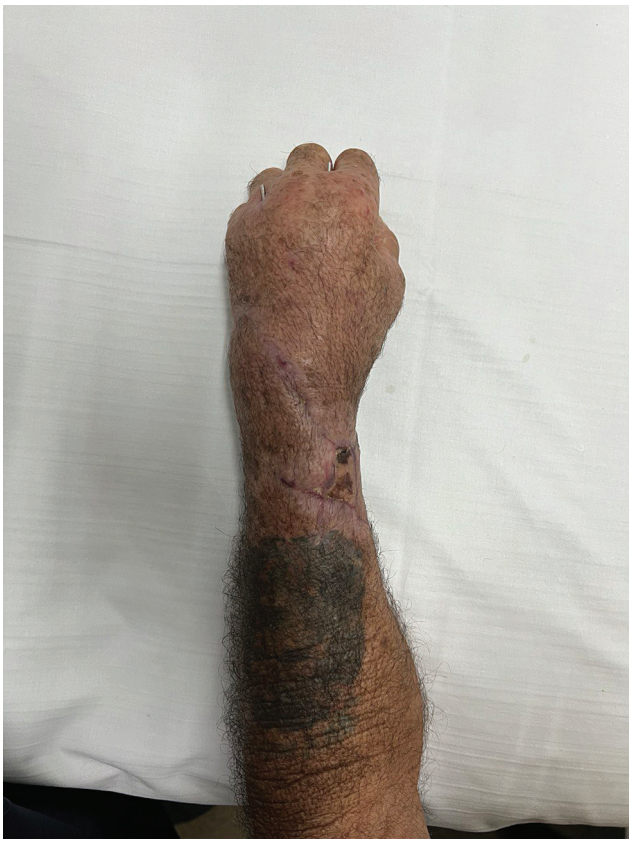

**Fig. 9** and **10** Affected limb 2 months after surgery.

**Fig. 8** Postoperative monitoring.

patient was satisfied with not losing the limb, but he was experiencing difficulty in mobilization even during simple activities (►**Figs. 9,10**).

After 6 months, the patient underwent a tendon transfer, involving the removal of a segment of the flexor carpi radialis to reconstruct the extensor carpi ulnaris, potentially allowing better wrist flexion and range of motion. During outpatient follow-up, the range of motion improved, but not enough to support full movements due to inadequate physical therapy assistance (►**Figs. 11,12**).

**Fig. 11** and **12** Tendon transfer.

## Discussion

Several systemic challenges hinder the management of hand replantation cases in Brazil, starting with the logistical challenges of time and distance required for the replantation, the window of opportunity is small, with rapid transport and highly specialized hospital infrastructure often lacking outside larger centers. The unequal distribution of microsurgeons and multidisciplinary teams, restricted access to referral centers, and the lack of well-defined protocols for triage and transfer only exacerbate this problem.

Economic and political issues further complicate this matter. The high cost of materials, staff, and the lengthy rehabilitation required are often not covered by public budgets or supplementary health insurance plans. As such, many services opt for cheap, quick solutions, like amputation and subsequent prosthesis.

In the United States, the trend of performing fewer replantation procedures in adult patients has also gained momentum. The current focus on cost-effectiveness and postoperative quality of life has led to a more pragmatic paradigm: in many cases, adaptation with a modern prosthesis is considered to provide functional and psychological outcomes as good as or even better than replantation, especially when the latter is incomplete, has a poor indication, or when rehabilitation is deemed inadequate.

However, this trend requires careful interpretation in countries such as Brazil, where access to quality prosthetics and rehabilitation remains scarce. There is a risk of adopting an economic logic from more developed countries without providing proper treatment for the local population.

## Conclusion

Even over 50 years after the first case, we still face difficulties in replantation procedures due to their delicate nature, the unavailability of an emergency microsurgery service due to a lack of specialized personnel capable of providing salvage surgery for a traumatized limb, and the absence of multidisciplinary support with physical therapy and psychological support during limb rehabilitation. These are key barriers to successful treatment. With no proper rehabilitation, even the best surgical technique becomes an empty promise.

### Data Availability

Data will be available upon request to the corresponding author.

### Authors' Contributions

DCRP: formal analysis, funding acquisition, conceptualization, resources, methodology, project administration, investigation, writing – original draft, writing – review & editing, and visualization. BBGPP: conceptualization, methodology, and investigation.

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### Clinical Trials

None.

### Conflict of Interests

The authors have no conflict of interests to declare.

## References

1 Ely JB, Pereira Filho OJ, Mendes PRS, Lee KH, Vasconcellos ZAA. Evolução e avaliação de 2 pacientes submetidos a reimplante total de membro superior. Um de Porto Alegre em 1968 (primeiro reimplante do Brasil - meio século) e outro de Bruxelas em 1980. Rev Bras Cir Plást 2018;33(Suppl 1):133–135. Doi: 10.5935/2177-1235.2018RBCP0070

2 Costa CA, Cabral PHO, Pinto PL, Pinheiro MJC Júnior, Santos NJN, Birolini D. Initial experience with hand replantation after traumatic amputation in a nonspecialized center. J Vasc Bras 2006;5 (04):321–324

3 Monir JG, Cooke H, Jagiella-Lodise O, McQuillan T, Wagner E, Zelenski NA. Trends in Digit Replantation and Revision Amputation in the United States From 2009 to 2019. J Hand Surg Glob Online 2024;6(06):855–860. Doi: 10.1016/j.jhsg.2024.07.012

4 Silva JB, Ramos RM, Muñiz AR, Ferdinando MP. Trauma da mão. Parte 2. Rev AMRIGS 2014;58:291–301